

## Surface Mount Tape and Reel Specification

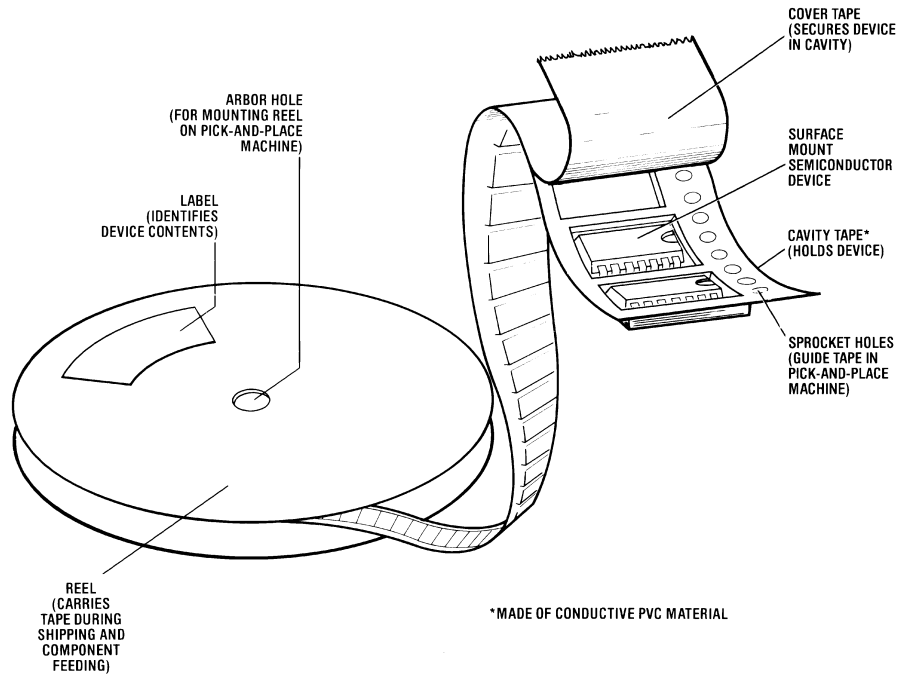
### General Description

Tape-and-Reel is a method for shipment of surface mount devices. This approach simplifies the handling of semiconductors for automated circuit board assembly systems. A Tape-and-Reel holds hundreds-to-thousands of surface mount devices (as compared with less than 100 devices in a rail), so that pick-and-place machines have to be reloaded less frequently. This savings in labor will further reduce manufacturing costs for automated circuit board assembly.

### Features

- Conductive PVC material reduces static charge buildup
- Fully meets proposed EIA standard RS-481A (taping of surface-mounted components for automatic placing)
- Fully compatible with Fairchild's surface mount package types
- Variable code density code 39 bar code label for Automated Inventory Management availability
- Mechanical samples of surface mount packages available in Tape-and-Reel for automated assembly process development
- Single Tape-and-Reel holds hundreds-to-thousands of surface mount semiconductors for additional labor savings
- Conductive cover Tape-and-Reel availability
- Reels individually packed

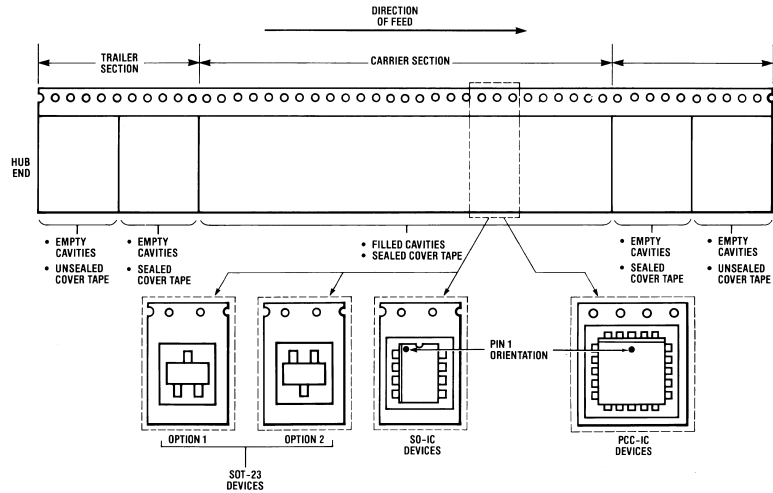
Tape-and-Reel Diagram



MS500145-1

## Tape-and-Reel Overview

### TAPE FORMAT AND DEVICE ORIENTATION



MS500145-2

		Page			Page
Small Outline IC (SO-IC)	SO-8 (Narrow)	4	Plastic Chip Carrier IC (PLCC-IC)	PLCC-20	11
	SO-14 (Narrow)	5		PLCC-28	12
	SO-14 (Wide)	6			
	SO-16 (Narrow)	7			
	SO-16 (Wide)	8			
	SO-20 (Wide)	9			
	SO-24 (Wide)	10			

### MATERIALS

Cavity Tape:	Conductive PVC (less than $10^5 \Omega/\text{Sq}$ )	Reel:	1. Solid 80 pt. Fibreboard (standard)
Cover Tape:	Polyester		2. Conductive Fibregboard available
	1. Conductive Cover available		3. Conductive Plastic (PVC) available

### LABEL

Human and machine readable label is provided on reel. A variable (C.P.I.) density code 39 is available. FSC STD Label (7.6 C.P.I.).

#### Field

Lot Number

Date Code

Revision Level

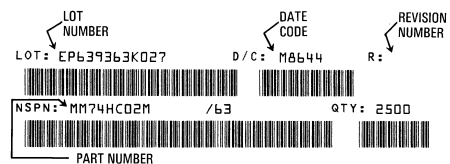
Fairchild Part No. I.D.

Quantity

Fields are separated by at least one blank space.

Future Tape-and-Reel packs will also include a smaller-size bar code label (high-density code 39) at the beginning of the tape. (This tape label is not available on current production.)

Fairchild Semiconductor will also offer additional labels containing information per your specific specification.



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### TAPE FORMAT

Direction  
of  
Feed

[illegible]

## SO-14 (Narrow)

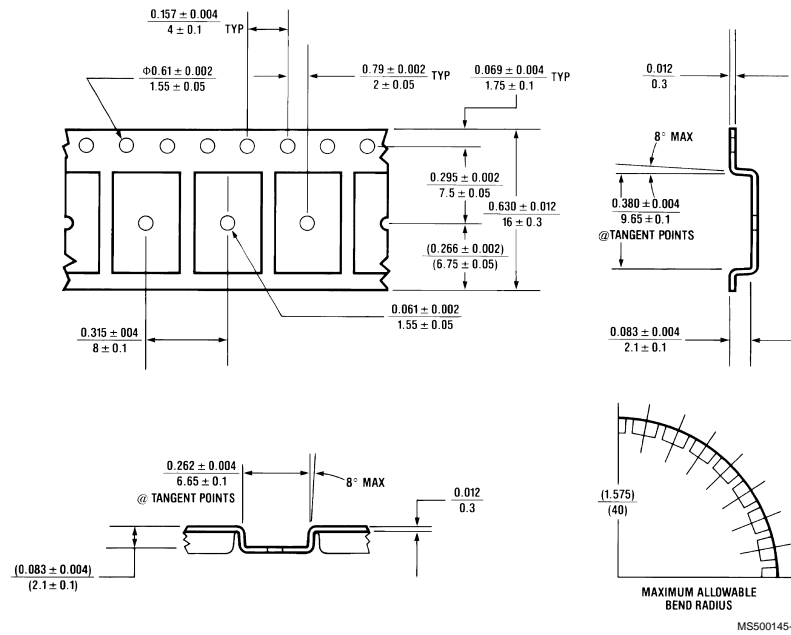
### TAPE FORMAT

Direction  
of  
Feed

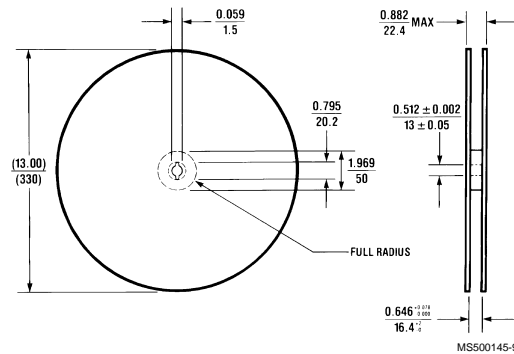


Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader	5 (min)	Empty	Unsealed
(Start End)	5 (min)	Empty	Sealed
Carrier	2500	Filled	Sealed
Trailer	2 (min)	Empty	Sealed
(Hub End)	2 (min)	Empty	Unsealed

### TAPE DIMENSIONS



### REEL DIMENSIONS



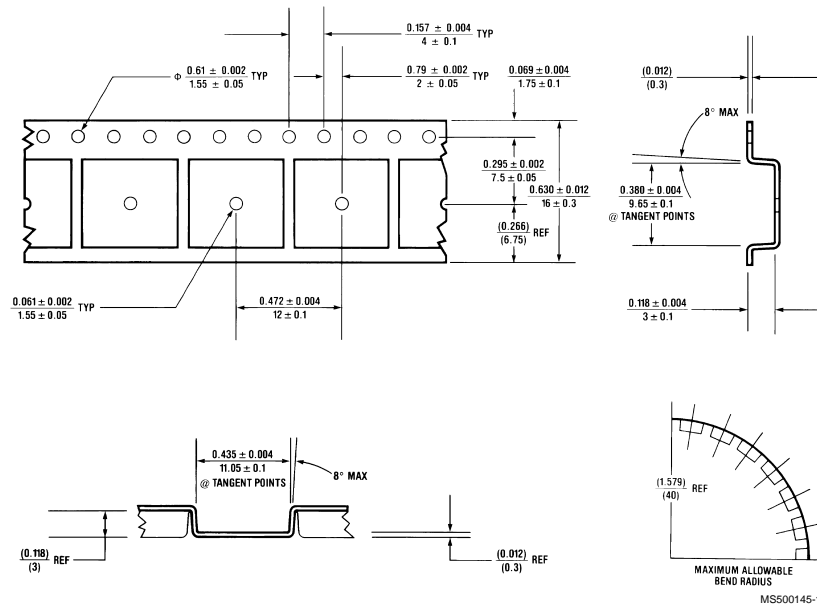
## SO-14 (Wide)

### TAPE FORMAT

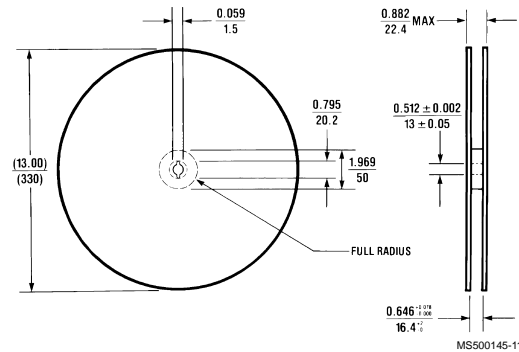
Direction  
of  
Feed ↑

Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader (Start End)	5 (min)	Empty	Unsealed
	5 (min)	Empty	Sealed
Carrier	2500	Filled	Sealed
Trailer (Hub End)	2 (min)	Empty	Sealed
	2 (min)	Empty	Unsealed

### TAPE DIMENSIONS



### REEL DIMENSIONS

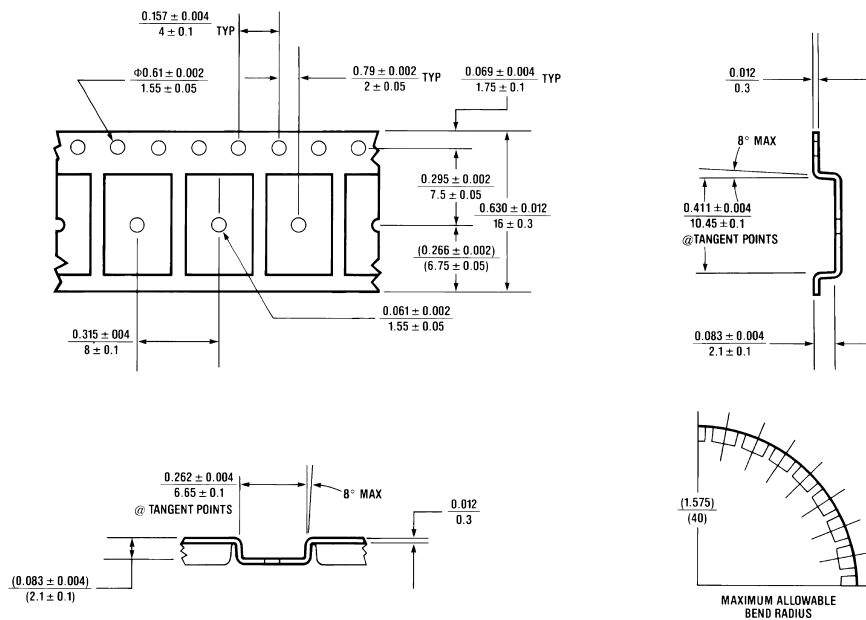


### SO-16 (Narrow)

### TAPE FORMAT

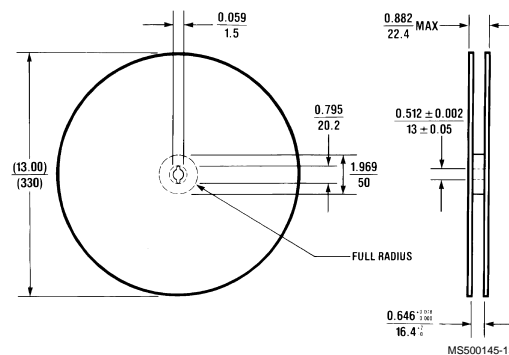
Direction of Feed	↑	Tape Section	# Cavities	Cavity Status	Cover Tape Status
		Leader (Start End)	5 (min)	Empty	Unsealed
			5 (min)	Empty	Sealed
		Carrier	2500	Filled	Sealed
		Trailer (Hub End)	2 (min)	Empty	Sealed
			2 (min)	Empty	Unsealed

## TAPE DIMENSIONS



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## REEL DIMENSIONS



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### TAPE FORMAT

Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader	5 (min)	Empty	Unsealed
(Start End)	5 (min)	Empty	Sealed
Carrier	1000	Filled	Sealed
Trailer	2 (min)	Empty	Sealed
(Hub End)	2 (min)	Empty	Unsealed

[illegible]

MS500145-14

Technical drawing of a circular part with the following dimensions and tolerances:

- Overall diameter:  $13.00 \pm 0.002$  (330)
- Top edge thickness:  $0.059 \pm 0.002$  (1.5)
- Inner hole diameter:  $0.795 \pm 0.002$  (20.2)
- Inner hole depth:  $1.969 \pm 0.002$  (50)
- Bottom edge thickness:  $0.646 \pm 0.002$  (16.4)
- Right edge thickness:  $0.882 \pm 0.002$  (22.4) MAX
- Right edge width:  $0.512 \pm 0.002$  (13  $\pm 0.05$ )
- Label: FULL RADIUS

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## SO-20 (Wide)

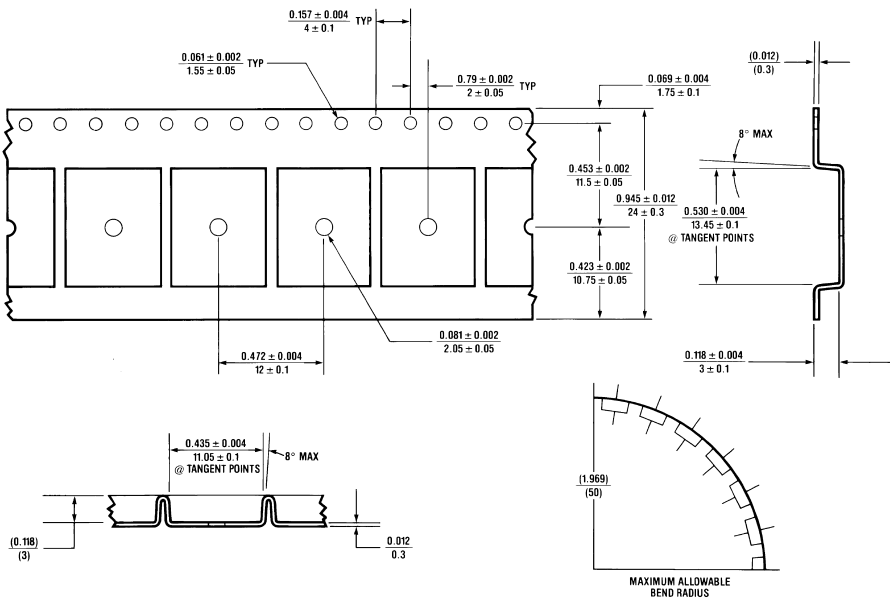
### TAPE FORMAT

Direction  
of  
Feed



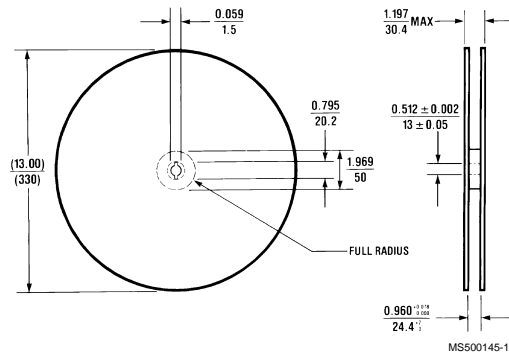
Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader	5 (min)	Empty	Unsealed
(Start End)	5 (min)	Empty	Sealed
Carrier	1000	Filled	Sealed
Trailer	2 (min)	Empty	Sealed
(Hub End)	2 (min)	Empty	Unsealed

### TAPE DIMENSIONS



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### REEL DIMENSIONS



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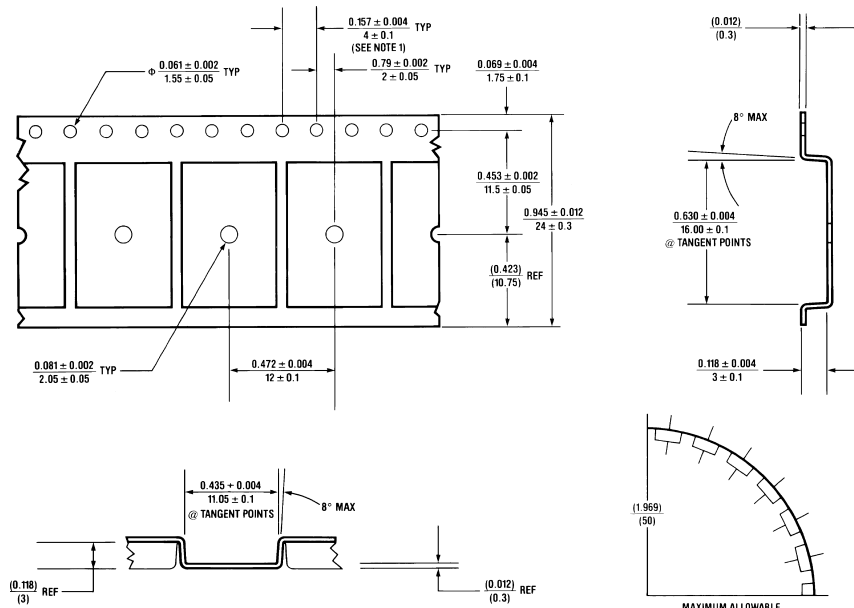
## SO-24 (Wide)

### TAPE FORMAT

Direction  
of  
Feed ↑

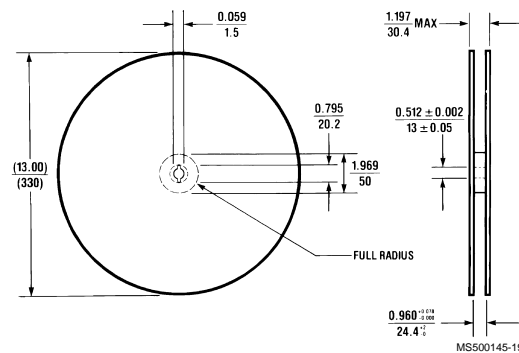
Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader (Starter End)	5 (min)	Empty	Unsealed
	5 (min)	Empty	Sealed
Carrier	1000	Filled	Sealed
Trailer (Hub End)	2 (min)	Empty	Sealed
	2 (min)	Empty	Sealed

### TAPE DIMENSIONS



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### REEL DIMENSIONS



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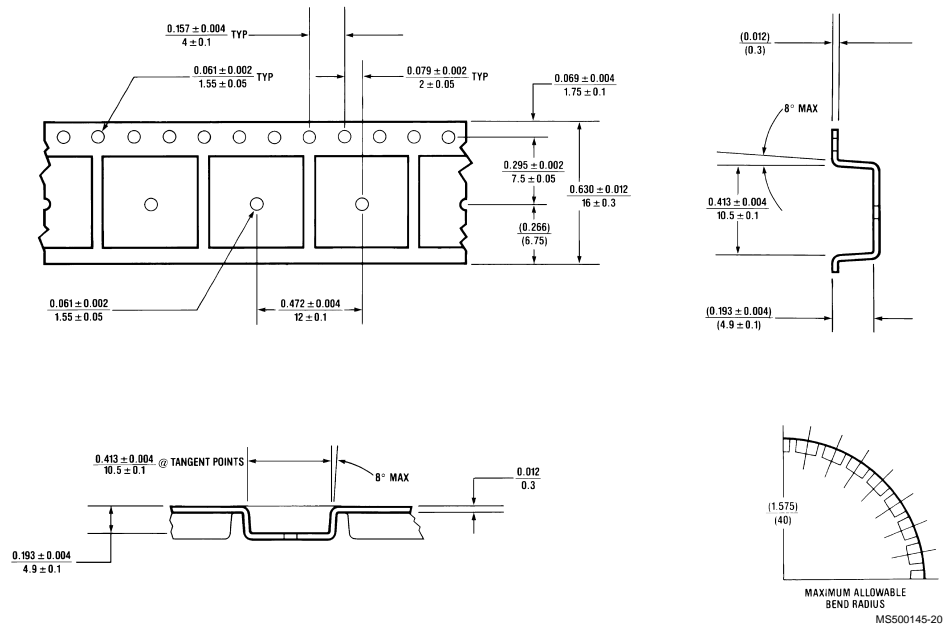
# PLCC-20

## TAPE FORMAT

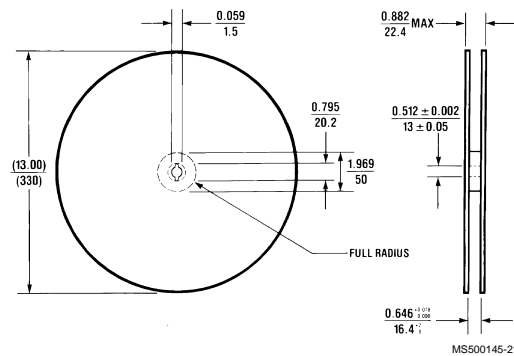
Direction  
of  
Feed ↑

Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader (Starter End)	5 (min)	Empty	Unsealed
	5 (min)	Empty	Sealed
Carrier	1000	Filled	Sealed
Trailer (Hub End)	2 (min)	Empty	Sealed
	2 (min)	Empty	Sealed

## TAPE DIMENSIONS



## REEL DIMENSIONS



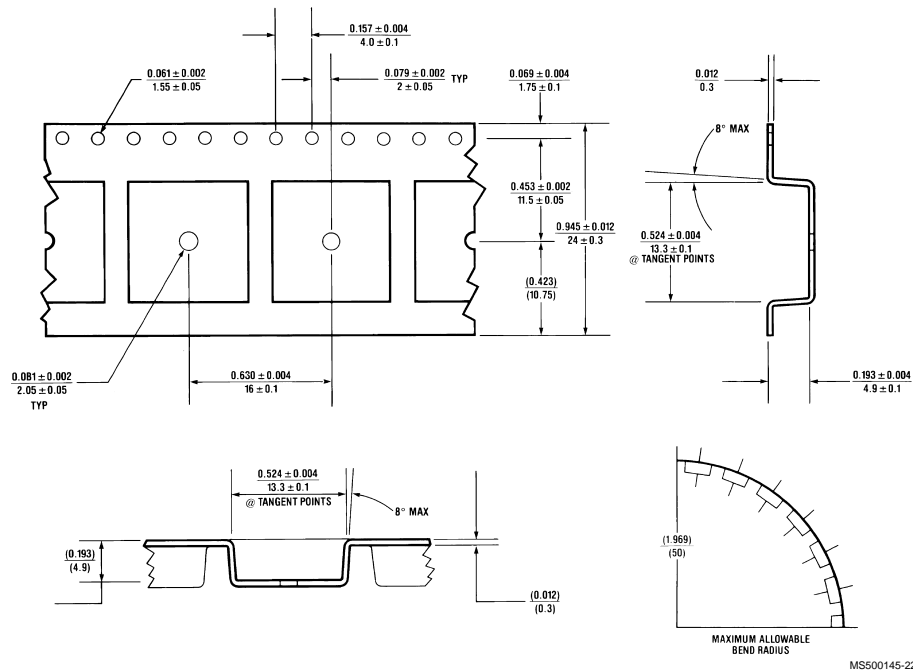
# PLCC-28

## TAPE FORMAT

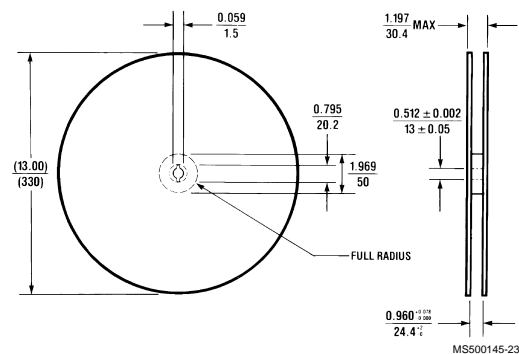
Direction  
of  
Feed ↑

Tape Section	# Cavities	Cavity Status	Cover Tape Status
Leader (Starter End)	5 (min)	Empty	Unsealed
	5 (min)	Empty	Sealed
Carrier	750	Filled	Sealed
Trailer (Hub End)	2 (min)	Empty	Sealed
	2 (min)	Empty	Sealed

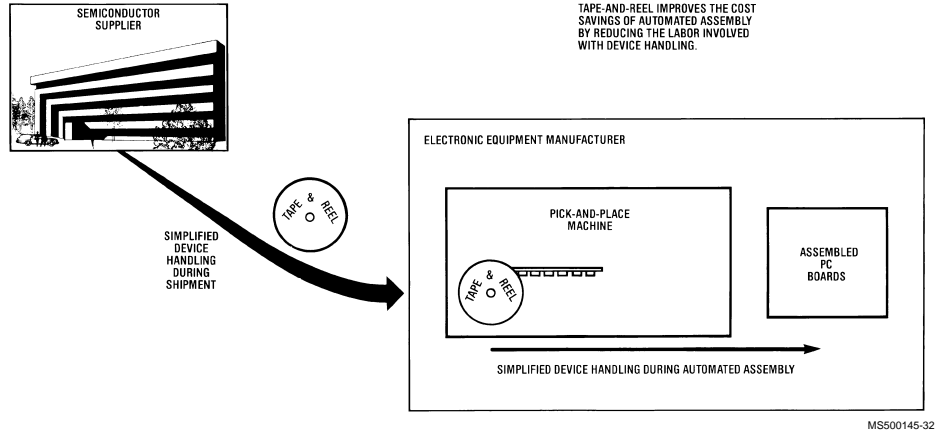
## TAPE DIMENSIONS



## REEL DIMENSIONS



## Application-Total System Saving



MS500145-32

Cost pressures today are forcing many electronics manufacturers to automate their production lines. Surface mount technology plays a key role in this cost-savings trend because:

- The mounting of devices on the PC board surface eliminates the expense of drilling holes;
- The use of pick-and-place machines to assemble the PC boards greatly reduces labor costs;
- The lighter and more compact assembled products resulting from the smaller dimensions of surface mount packages mean lower material costs.

Production processes now permit both surface mount and insertion mount components to be assembled on the same PC board.

Automated manufacturers can improve their cost savings by using Tape-and-Reel for surface mount devices. Simplified handling results because hundreds-to-thousands of semiconductors are carried on a single Tape-and-Reel pack (see the "Ordering Information" section for the exact quantities). With this higher device count per reel (when compared with less than 100 devices per rail), pick-and-place machines have to be re-loaded less frequently and lower labor costs result.

With Tape-and-Reel, manufacturers save twice — once from using surface mount technology for automated PC board assembly and again from less device handling during shipment and machine set-up.

## Ordering Information

When you order a surface mount semiconductor, it will be in one of the available surface mount package types (see Appendix II for the physical dimensions of the surface mount

packages). Specifying the Tape-and -Reel method of shipment ((Note 1)) means that you will receive your devices in the following quantities per Tape-and-Reel pack:

		Device Quantity
Small Outline IC	SO-8 (Narrow)	2500
	SO-14 (Narrow)	2500
	SO-14 (Wide)	1000
	SO-16 (Narrow)	2500
	SO-16 (Wide)	1000
	SO-20 (Wide)	1000
	SO-24 (Wide)	1000
Plastic Chip Carrier IC	PLCC-20	1000
	PLCC-28	750

**Note 1:** For surface mount integrated circuits, your order will automatically be shipped in conductive rails unless you indicate "Tape-and-Reel" after the device description on your purchase order.

Example: You order 5,000 74AC14SC ICs shipped in Tape-and-Reel.

- All 5,000 devices have the same date code
- You receive 2 SO-14 (Narrow) Tape-and-Reel packs, each having 2500 74AC14SC ICs

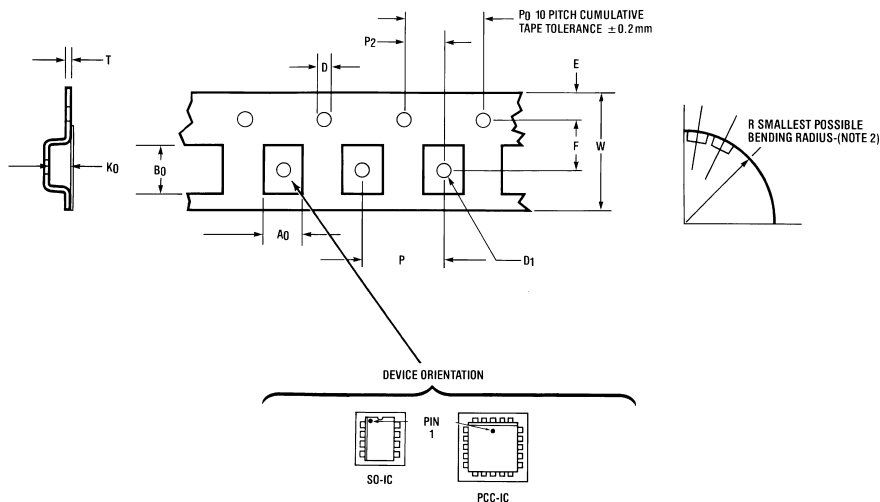
## Appendix I— Short-Form Procurement Specification

### TAPE FORMAT

	→ Direction of Feed				
	Trailer (Hub End)		Carrier	Leader (Start End)	
	Empty Cavities, min (Unsealed Cover Tape)	Empty Cavities, min (Sealed Cover Tape)	Filled Cavities (Sealed Cover Tape)	Empty Cavities, min (Sealed Cover Tape)	Empty Cavities, min (Unsealed Cover Tape)
<b>SMALL OUTLINE IC</b>					
SO-8 (Narrow)	2	2	2500	5	5
SO-14 (Narrow)	2	2	2500	5	5
SO-14 (Wide)	2	2	1000	5	5
SO-16 (Narrow)	2	2	2500	5	5
SO-16 (Wide)	2	2	1000	5	5
SO-20 (Wide)	2	2	1000	5	5
SO-24 (Wide)	2	2	1000	5	5
<b>PLASTIC SHIP CARRIER IC</b>					
PLCC-20	2	2	1000	5	5
PLCC-28	2	2	750	5	5

## Appendix I— Short-Form Procurement Specification (Continued)

### TAPE DIMENSIONS (24 Millimeter Tape or Less)



MS500145-33

	W	P	F	E	P <sub>2</sub>	P <sub>0</sub>	D	T	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	D <sub>1</sub>	R
<b>SMALL OUTLINE IC</b>													
SO-8 (Narrow)	12±.30	8.0±.10	5.5±.05	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	6.4±.10	5.2±.10	2.1±.10	1.55±.05	30
SO-14 (Narrow)	16±.30	8.0±.10	7.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	6.5±.10	9.0±.10	2.1±.10	1.5±.05	40
SO-14 (Wide)	16±.30	12.0±.10	7.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	10.9±.10	9.5±.10	3.0±.10	1.55±.05	40
SO-16 (Narrow)	16±.30	8.0±.10	7.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	6.5±.10	10.3±.10	2.1±.10	1.55±.05	40
SO-16 (Wide)	16±.30	12.0±.10	5.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	10.9±.10	0.76±.10	3.0±.10	1.55±.05	40
SO-20 (Wide)	24±.30	12.0±.10	11.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	10.9±.10	13.3±.10	3.0±.10	2.05±.05	50
SO-24 (Wide)	24±.30	12.0±.10	11.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	10.9±.10	5.85±.10	3.0±.10	2.05±.05	50
<b>PLASTIC CHIP CARRIER IC</b>													
PLCC-20	16±.30	12.0±.10	7.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	9.3±.10	9.3±.10	4.9±.10	1.55±.05	40
PLCC-28	24±.30	16.0±.10	11.5±.10	1.75±.10	2.0±.05	4.0±.10	1.55±.05	.30±.10	13.0±.10	13.0±.10	4.9±.10	2.05±.05	50

Note A: A<sub>0</sub>, B<sub>0</sub> and K<sub>0</sub> dimensions are measured 0.3 mm above the inside wall of the cavity bottom.

Note B: Tape with components shall pass around a mandril radius R without damage.

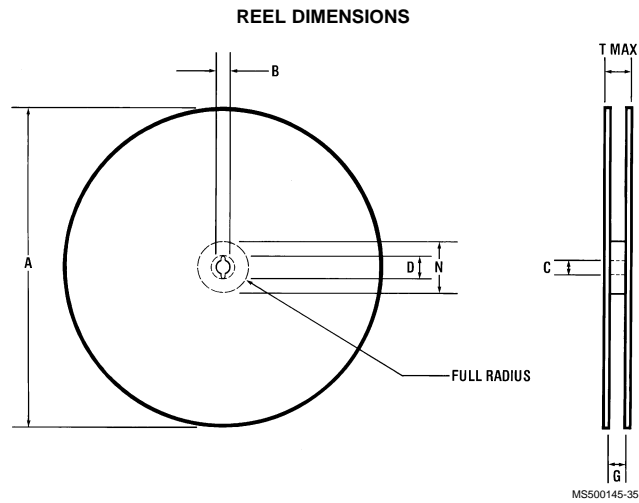
Note C: Cavity tape material shall be PVC conductive (less than 10<sup>5</sup> Ω/Sq).

Note D: Cover tape material shall be polyester (30–65 grams peel-back force).

Note E: D<sub>1</sub> Dimension is centered within cavity.

Note F: All dimensions are in millimeters.

## Appendix I— Short-Form Procurement Specification (Continued)



		A (Max)	B (Min)	C	D (Min)	N (Min)	G		T (Max)
12 mm Tape	SO-8 (Narrow)	(13.00)	0.059	0.512±0.002	0.795	1.969	0.488	+0.045 -0.000	0.724
		(330)	1.5	13±0.05	20.2	50	12.4	+2 -0	18.4
16 mm Tape	SO-14 (Narrow)	(13.00)	0.059	0.512±0.002	0.795	1.969	0.646	+0.078 -0.000	0.882
	SO-14 (Wide)								
	SO-16 (Narrow)								
	SO-16 (Wide) PLCC-20	(330)	1.5	13±0.05	20.2	50	16.4	+2 -0	22.4
24 mm Tape	SO-20 (Wide)	(13.00)	0.059	0.512±0.002	0.795	1.969	0.960	+0.078 -0.000	1.197
	SO-24 (Wide)								
	PLCC-28	(330)	1.5	13±0.05	20.2	50	24.4	+2 -0	30.4

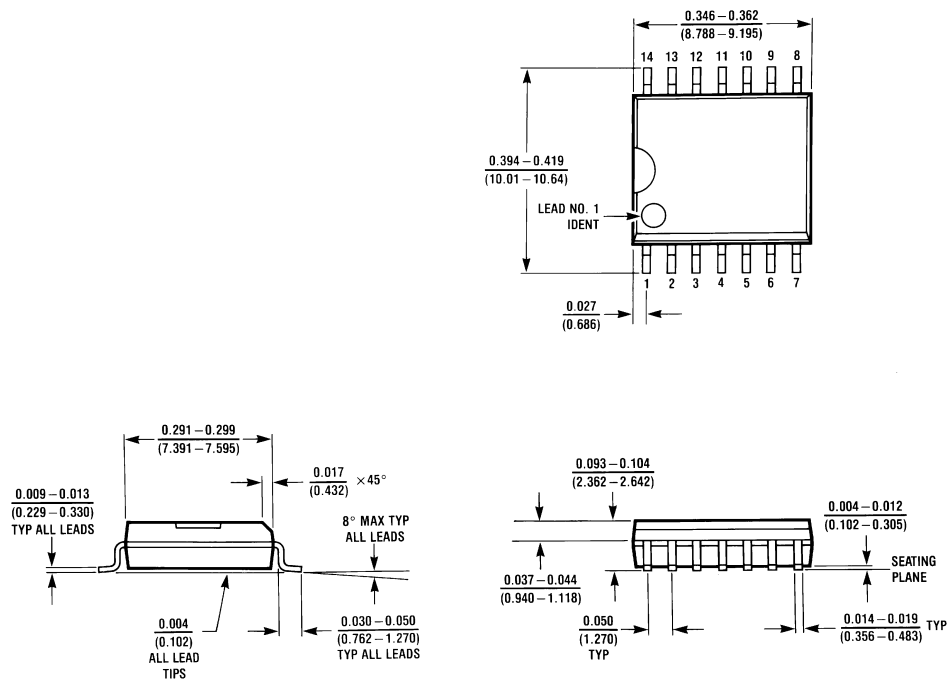
Units:  $\frac{\text{Inches}}{\text{Millimeters}}$

**Material: Paperboard (Non-Flaking)**



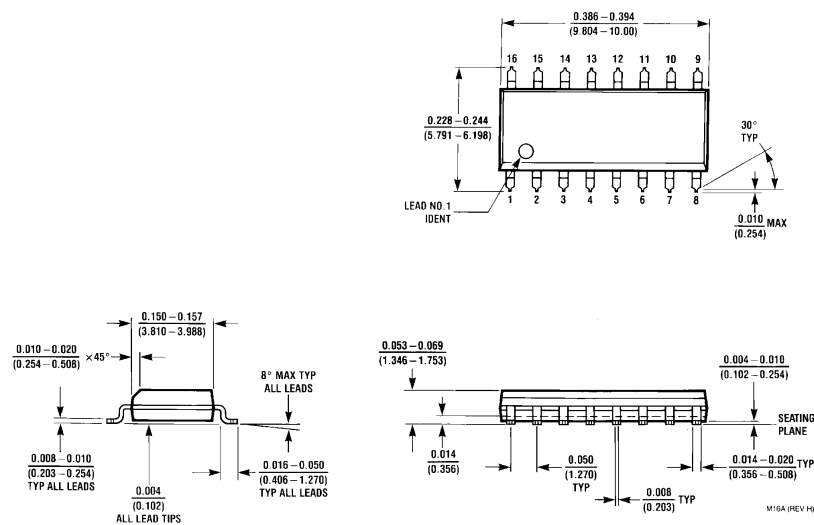
## Appendix II—Physical Dimensions of Surface Mount Packages

### SO-14 (Wide)



M14B (REV D)

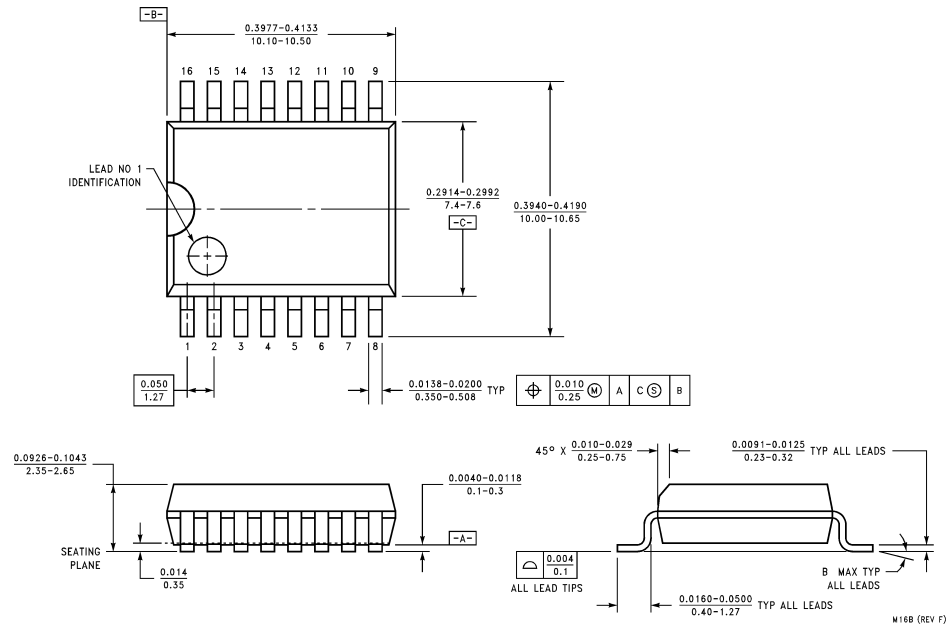
### SO-16 (Narrow)



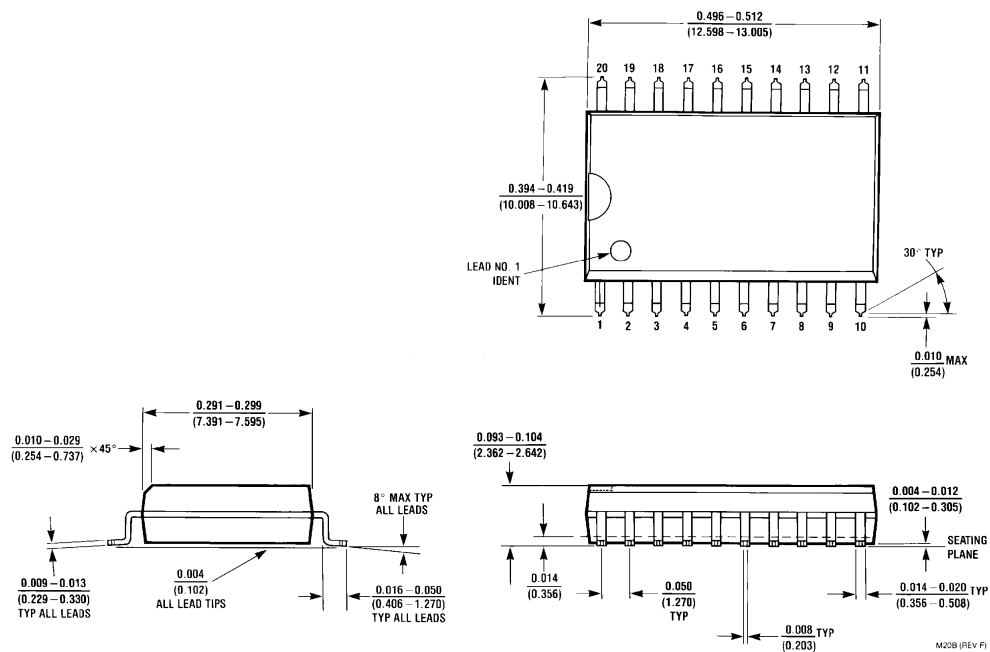
M16A (REV H)

## Appendix II—Physical Dimensions of Surface Mount Packages (Continued)

### SO-16 (Wide)

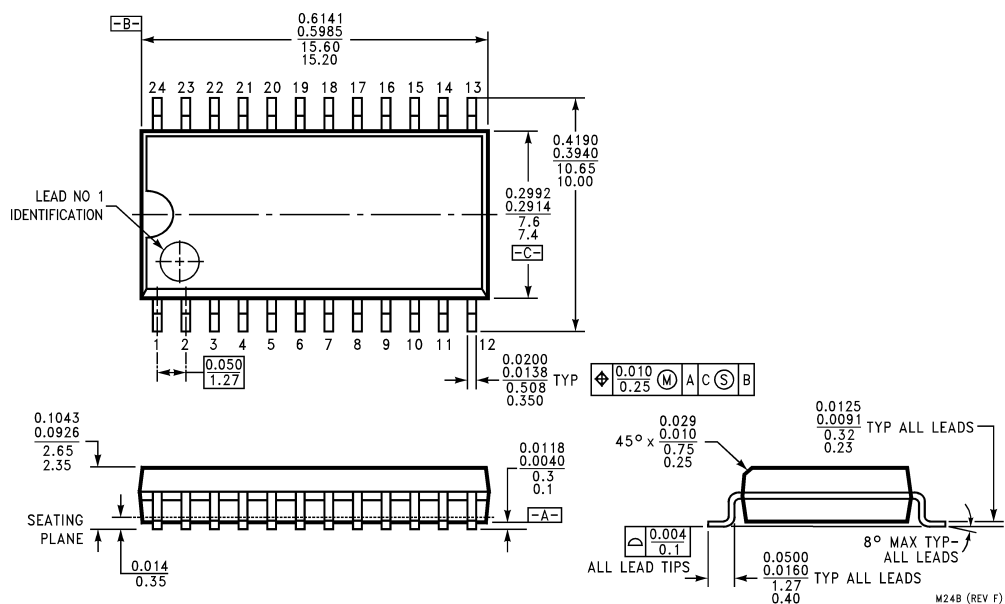


### SO-20 (Wide)

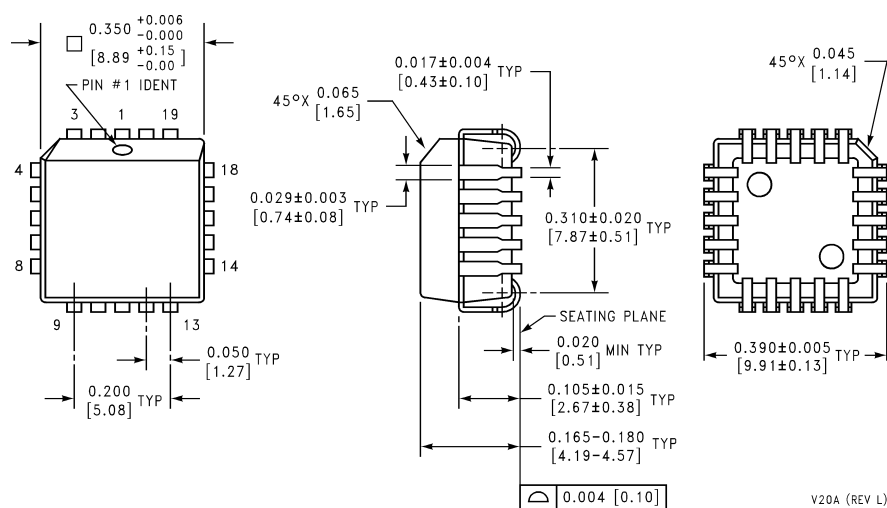


## Appendix II—Physical Dimensions of Surface Mount Packages (Continued)

### SO-24 (Wide)

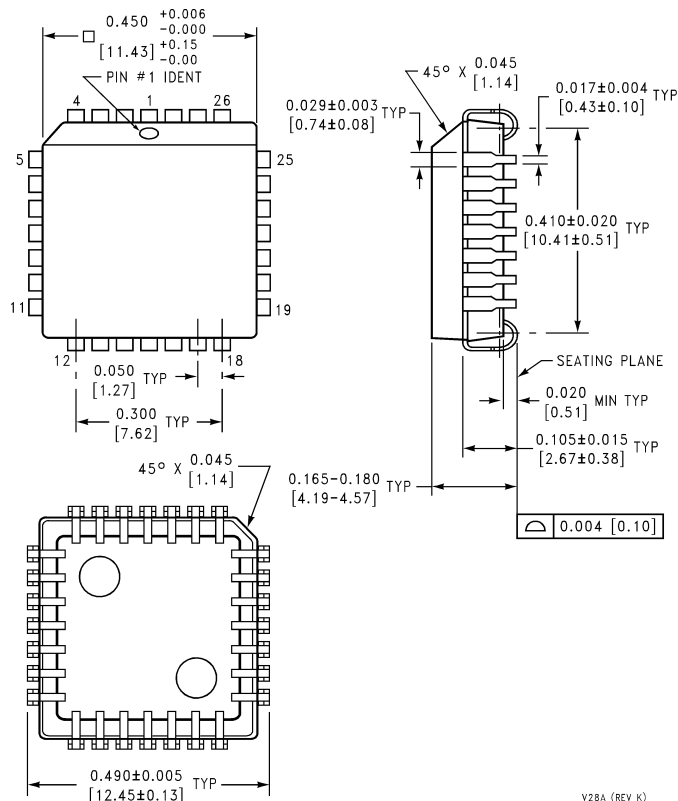


### PLCC-20



## Appendix II—Physical Dimensions of Surface Mount Packages (Continued)

PLCC-28



V28A (REV K)

### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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